## REMARKS



**Objections to Claims 6, 8, 18 and 20 are Overcome**

The Office has objected to claims 6, 8, 18, and 20 based on informalities. With this response, claims 6, 8, 18 and 20 are amended to correct these informalities. The objections to claims 6, 8, 18, and 20 are overcome and the Applicant respectfully requests withdrawal of the objections.

**Objection to the Abstract is Overcome**

The Office has objected to the abstract based on informalities. With this response, the abstract is amended to remove the phrase "the invention advantageously provides." With this response, the objection to the abstract is overcome. Applicant respectfully requests withdrawal of the objections.

**Claims 1, 8 and 35 are Allowable under §112, Second Paragraph**

The Office has rejected claims 1, 8 and 35 under 35 U.S.C. §112, second paragraph. With this response, claims 1 and 8 are amended to clarify the origin of the macroblocks, as suggested by the Office. Claim 35 is canceled without comment, prejudice or disclaimer. With this response, the rejections under §112 are overcome. Applicant respectfully requests withdrawal of the §112 rejections.

**Claims 1-5 and 8-16 are Allowable over Kondo**

The Office has rejected claims 1-3 and 8-12, at page 4 of the Office Action, under 35 U.S.C. §102(b), as being anticipated by U.S. Patent No. 5,576,772 ("Kondo"). The Office has also rejected claims 4, 5 and 13-16, at page 9 of the Office Action, under 35 U.S.C. §103(a) as being unpatentable over Kondo. Applicant respectfully traverses the rejections.

None of the cited references, including Kondo, disclose or suggest each and every element of claim 1. For example, Kondo does not disclose or suggest "determining a similarity of one of said reference macroblocks and a selected one of said at least one current macroblock

based on averages of every two adjacent pixels as a pixel unit in said selected current macroblock and said reference macroblock," as recited in claim 1. In contrast to claim 1, Kondo discloses determining differences between a constant component and transient components of a block of pixels. The constant component may be a mean value for the block of pixels. *See Kondo*, col. 7, lines 11-16. The transient component may be " a standard deviation, a high frequency component, a high order component of a set of orthogonally transformed coefficients, a dynamic range, a differential value of mean values, a maximum value of differential values of mean values, and so forth." *See Kondo*, col. 7, lines 18-23. Kondo discloses summing differences between the constant and transient components for the second and third hierarchical stages. *See Kondo*, col. 8, lines 48-57 and col. 9, lines 16-28. Kondo discloses, for only the last block, summing the absolute value of pixel-by-pixel differences. *See Kondo*, col. 9, lines 43-49. However, Kondu does not disclose or suggest "repeating step (a3) for all of said reference macroblocks in said search range," as recited in claim 1. Rather, Kondo discloses adjacent pixel calculations only for the last macroblock of a frame. Accordingly, Kondo does not disclose "(a3) determining a similarity of one of said reference macroblocks and a selected one of said at least one current macroblock based on averages of every two adjacent pixels as a pixel unit in said selected current macroblock and said reference macroblocks, (a4) repeating step (a3) for all of said reference macroblocks in said search range," as recited in claim 1. Hence, claim 1 is allowable.

Claims 2-5 depend from allowable claim 1. Therefore, claims 2-5 are allowable over Kondo, at least by virtue of their dependency from claim 1.

Further, none of the cited references, including Kondo, disclose or suggest each and every element of claim 8. For example, Kondo does not disclose or suggest "(b3) determining a similarity of one of said reference macroblocks and said current macroblock based on averages of every two adjacent pixels as a pixel unit in said current macroblock and a first determined set of said reference macroblocks," as recited in claim 8. As previously discussed, Kondo discloses evaluating constant and transient components of a pixel block. Kondo discloses that "constant and transient components are evaluated (for 4 pixels x 4 lines) blocks of a predetermined search range and used to obtain a course motion vector." *See Kondo*, col. 6, lines 60-64. Thus, Kondo determines a motion vector from constant and transient components. Kondo fails to disclose or

suggest "(b3) determining a similarity of one of said reference macroblocks and said current macroblock based on averages of every two adjacent pixels as a pixel unit in said current macroblock and a first determined set of said reference macroblocks," as recited in claim 8. Therefore, Kondo fails to disclose at least one element of claim 8.

Claims 9-16 depend from claim 8, which Applicant has shown to be allowable. Hence, Kondo fails to disclose at least one element of claims 9-16, at least by virtue of their dependency from claim 8. Accordingly, claims 8-16 are allowable over Kondo.

**Claims 1-3, 8-10, 21-34, and 36-38 are Allowable over Jeng**

The Office has rejected claims 1-3, 8-10, 21-26, 34, and 36-38 at page 7 of the Office Action, under 35 U.S.C. §102(b), as being anticipated by U.S. Patent No. 6,011,870 ("Jeng"). The Office has also rejected claims 27-33, at page 10 of the Office Action, under 35 U.S.C. §103(a) as being unpatentable over Jeng. Applicant respectfully traverses the rejections.

None of the cited references, including Jeng, disclose or suggest each and every element of claim 1. In particular, Jeng fails to disclose or suggest "determining a similarity of one of said reference macroblocks and a selected one of said at least one current macroblock based on averages of every two adjacent pixels as a pixel unit in said selected current macroblock and said reference macroblocks, as recited in claim 1. Rather, Jeng discloses calculating a motion vector based on every other vertically-neighboring pair of pixels, "without actually calculating an average amount for any pel pair, but rather merely passing through alternating pel pairs, effectively to reduce computational activity." *See Jeng*, col. 8, lines 34-46. Thus, Jeng fails to disclose every element of claim 1, or of claims 2, 3, and 21-23, at least by virtue of their dependency from claim 1. Claims 1-3 and 21-23 are allowable over Jeng.

Further, none of the cited references, including Jeng, disclose or suggest each and every element of claim 8. Jeng does not disclose or suggest "(b3) determining a similarity of one of said reference macroblocks and said current macroblock based on averages of every two adjacent pixels as a pixel unit in said current macroblock and a first determined set of said reference macroblocks," as recited by claim 8. Rather, Jeng discloses calculating a motion vector based on every other vertically-neighboring pair of pixels, "without actually calculating an average

amount for any pel pair, but rather merely passing through alternating pel pairs, effectively to reduce computational activity." *See Jeng*, col. 8, lines 34-46. Thus, Jeng fails to disclose every element of claim 8, or of claims 9-10, and 24-26, at least by virtue of their dependency from claim 8. Claims 8-10, and 24-26 are allowable over Jeng.

Additionally, none of the cited references, including Jeng, disclose or suggest each and every element of claim 27. Jeng does not disclose or suggest a "first motion estimation processor to determine a similarity of a reference macroblock and a current macroblock associated with an image from the plurality of image frame data, wherein the reference macroblock and the current macroblock comprise multiple pixels, the first motion estimation processor to determine the similarity based on averages of every two adjacent pixels as a pixel unit in the current macroblock and a first determined set of pixels of the reference macroblock," as recited by claim 27. Rather, Jeng discloses calculating a motion vector based on every other vertically-neighboring pair of pixels, "without actually calculating an average amount for any pel pair, but rather merely passing through alternating pel pairs, effectively to reduce computational activity." *See Jeng*, col. 8, lines 34-46. Thus, Jeng fails to disclose every element of claim 27, and of claims 28-33, at least by virtue of their dependency from claim 27. Claims 27-33 are allowable over Jeng.

Further, none of the cited references, including Jeng, disclose or suggest each and every element of claim 34. Jeng does not disclose or suggest subtracting said averaged pixels of said current macroblock from corresponding said averaged pixels of said reference macroblock resulting in a plurality of differences," as recited by claim 34. Rather, Jeng discloses calculating a motion vector based on every other vertically-neighboring pair of pixels, "without actually calculating an average amount for any pel pair, but rather merely passing through alternating pel pairs, effectively to reduce computational activity." *See Jeng*, col. 8, lines 34-46. Thus, Jeng fails to disclose every element of claim 34 and of claims 36-38, at least by virtue of their dependency from claim 34. Claims 34 and 36-38 are allowable over Jeng.

**Claims 6, 7, 17, and 20 are Allowable over Kondu in view of Demos**

The Office has rejected claims 6, 7, 17, and 20, at page 11 of the Office Action, under 35 U.S.C. §103(a) as being unpatentable over Kondo in view of U.S. Patent No. 6,422,203 ("Demos"). Applicant respectfully traverses the rejections.

As previously discussed, Kondo fails to disclose or suggest each and every element of claims 1 and 8. Further, the Office acknowledges that Kondo does not disclose or suggest the use of multiplication. *See the Office Action*, p. 11. Demos fails to overcome the deficiencies of Kondo. Specifically, Demos fails to disclose or suggest "determining a similarity of one of said reference macroblocks and a selected one of said at least one current macroblock based on averages of every two adjacent pixels as a pixel unit in said selected current macroblock and said reference macroblock," as recited in claim 1. Similarly, Demos fails to disclose or suggest "determining a similarity of one of said reference macroblocks and said current macroblock based on averages of every two adjacent pixels as a pixel unit in said current macroblock and a first determined set of said reference macroblocks," as recited in claim 8. Accordingly, the asserted combination of Kondo and Demos fails to disclose or suggest at least one element of independent claims 1 and 8 and of claims 6, 7, 17 and 20, at least by virtue of their dependency from one of claims 1 or 8. Therefore, claims 6, 7, 17 and 20 are allowable over the asserted combination of Kondo and Demos.

**Claims 6, 7, and 17-20 are Allowable over Jeng in view of Demos**

The Office has rejected claims 6, 7, and 17-20, at page 11 of the Office Action, under 35 U.S.C. §103(a) as being unpatentable over Jeng in view of Demos. Applicant respectfully traverses the rejections.

As previously discussed, Jeng fails to disclose or suggest every element of claims 1 and 8. Further, the Office has acknowledged that Jeng fails to disclose or suggest use of multiplication. *See the Office Action*, p. 11. Demos fails to overcome the deficiencies of Jeng. Specifically, Demos fails to disclose or suggest "determining a similarity of one of said reference macroblocks and a selected one of said at least one current macroblock based on averages of every two adjacent pixels as a pixel unit in said selected current macroblock and said reference

macroblock," as recited in claim 1. Similarly, Demos fails to disclose or suggest "determining a similarity of one of said reference macroblocks and said current macroblock based on averages of every two adjacent pixels as a pixel unit in said current macroblock and a first determined set of said reference macroblocks," as recited in claim 8. Accordingly, the asserted combination of Jeng and Demos fails to disclose or suggest at least one element of independent claims 1 and 8 and of claims 6, 7, 17-20, at least by virtue of their dependency from one of claims 1 or 8. Therefore, claims 6, 7, 17-20 are allowable over the asserted combination of Jeng and Demos.

## CONCLUSION

Applicant has pointed out specific features of the claims not disclosed, suggested, or rendered obvious by the references applied in the Office Action. Accordingly, Applicant respectfully requests reconsideration and withdrawal of each of the objections and rejections, as well as an indication of the allowability of each of the pending claims.

Any changes to the claims in this amendment, which have not been specifically noted to overcome a rejection based upon the prior art, should be considered to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

The Examiner is invited to contact the undersigned attorney at the telephone number listed below if such a call would in any way facilitate allowance of this application.

The Commissioner is hereby authorized to charge any fees, which may be required, or credit any overpayment, to Deposit Account Number 50-2469.

Respectfully submitted,

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Jeffrey G. Toler, Reg. No. 38,342
Attorney for Applicant(s)
TOLER SCHAFFER, L.L.P.
8500 Bluffstone Cove, Suite A201
Austin, Texas 78759
(512) 327-5515 (phone)
(512) 327-5575 (fax)